

Sustainable food value chains and opportunities for entrepreneurship development: Concept and the case of marine fishery in India

A. Suresh

Principal Scientist, ICAR-CIFT, Kochi

Introduction

It is estimated that by the year 2050, the fish production in India has to improve to the tune of 13.8 million tonnes, warranting a production improvement of 62% compared to current level. Further, fishery has been recognised as a sunrise sector, and the export demand from the sector is bound to increase. The sector has to grow sufficiently enough to absorb growing labour force in India. In order to achieve this, the major drivers of growth in the constituent components need to be identified and prioritised for investment. In that milieu, the marine sector needs to focus on sustainability and the inland sector has to focus on intensive production without hampering the environmental health. In order to turn the increased production to increased value, post-production operations needs to be enhanced focusing on value addition, improved marketing and exports. Ensuring safety, quality and traceability in the entire value chain is critical in this attempt. This indicates that the value chains in fisheries needs to be sustainable in terms of its effect in environment, economy and society.

Fisheries and value chains

The growth in the fisheries sector is much higher than that witnessed in other sectors of agriculture. The sector is also highly linked with external markets thorough trade relations. The sector provided employment and livelihood security through about 14-15 million people in India. The sector witnesses sign of economic, technological and financial duality. This is because one can visualize co-existence of highly technologically advanced fishing sector with relatively technologically underdeveloped traditional sector. Thus, the value chain in marine fisheries portrays a picture of large variation. Further, emerging recognition that fish is a health food and the consumer preference for fish products and byproducts both as a food and as a medicine has opened bright business prospects. The central and various state governments provide financial support though various schemes to establish business units and handhold such enterprises at least in the initial phase of establishment. Further, the consumer is getting increasingly concerned about the safety and quality of fish. In this context, one can visualize a fast restructuring of the value chain in fisheries, particularly marine fish.

However, the concept of the value chain has acquired the element of sustainability into to so as to evolve into sustainable food value chain, as noted by Food and Agricultural Organization. Further, its usage has transcended from the level of a marketing management tool to that of a policy analysis one. A value chain describes the full range of activities which are required to

bring a product or a service from conception, through the different phases of production and delivery to final consumers (Porter, 1980). Often the concept of value chain is interchangeably used to notate a market chain, but there are very critical differences between them. While the market chain analysis intends to provide information on profitability for various agents along the market chain (Ferris *et al.*, 2001), a value chain analysis describes the range of activities required to bring a product to the final consumer and, the extent to which intermediaries/agents gain from participating in the chain (Jacinto, 2004). In that context, a value chain describes the distribution of the benefits or value addition to different economic agents, and touches the realms of development economics. In the initial days of the development of the concept, it was used for analyzing a single company, a sector, an organization or a product; however, later it was developed to analyze single or multiple sectors and to develop policies.

Kaplinsky and Morris (2000) identify three sets of reasons for the importance of value chain analysis. With the globalisation of labour and capital, and emergence of division of labour, achieving efficiency of production has gained greater policy focus. The corporate world try to attain systematic competitiveness in the context of growing division of labour and global dispersion of production components so as to achieve efficiency in production to penetrate global markets. Value chain analysis is also done to understand the dynamic factors that plays, so as to make the best out of globalisation. This approach essentially focuses on markets, with the aim of achieving overall efficiency in terms of increasing productivity and reducing cost. However, the attainment of efficiency need to factor in the opportunity cost of the resources and optimise the benefits over a long period of time. The trade-off between efficiency attainment and equity in distribution of the benefits for the stakeholders has also attained significance. Development of a win-win situation calls for imparting efficiency in attaining targets while generating maximum benefits to the actors along the value chain. In that context, sustainability of the value chain emerges as an important consideration.

Porter's value chain concept

The concept of value chain has its origins from the commodity chain approach, which focused on the physical product flow from the producer to final consumer. Michael Porter (1985) put forwarded value chain as the value addition in competitive markets. It is the core element in the production-to-consumption chain of activities, within an organisation framework. The value added should be more than the marginal cost of that activity, for the particular intervention to be sustainable. However, the concept doesn't address the larger concern of economic development of the sector, but was limiting itself to the organisational management. Porter's VC concept in that way deals essentially with firm-level strategy and not with broader economic development.

In Porter's concept ,the activities of the firm can be broadly split into 'primary activities' and 'support activities', depending on the whole functioning (Figure 1). The primary activities include inbound logistics, which include sourcing of the raw material; operations which include conversion of the raw material into final products; outbound logistics which include system of distribution centres, wholesalers, retailers and consumers; services including trainings. The

primary activities, either alone or in combination of them are essential for the firm to develop the competitive advantage for the value chain to be economically successful. On the otherhand, the support activities assist the primary activities in helping the organisation achieve its competitive advantage. They involve procurement including quality management; technology development to obtain competitive advantage with in the organisation including development of online facility; human resource management which includes recruitment, trainings, motivation, competitive advantage etc.; and, managing firm infrastructure, including managing finances, legal structure, and management structure. A co-ordination of all the activities are necessary for successful value chain development.

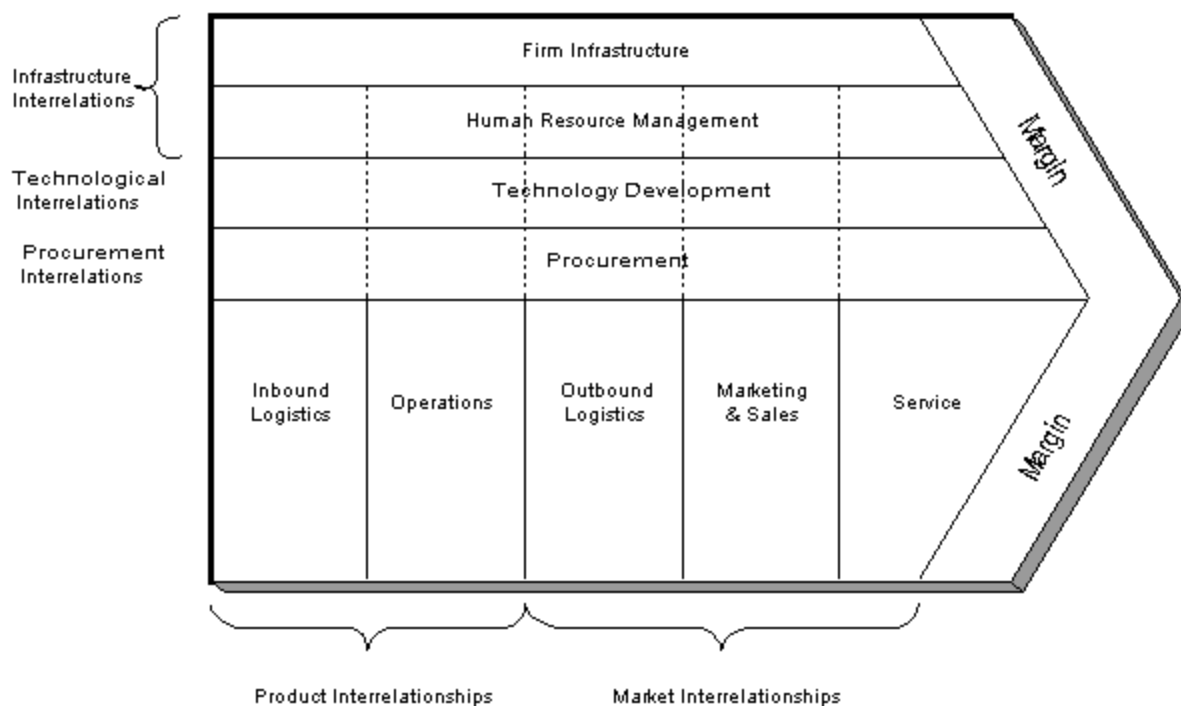


Figure 1: Michael Porter's value chain concept

Global Commodity Value Chain

On the otherhand, the global commodity value chain (GCV), as introduced by Gereffi and Korzeniewicz (1994), provides a developmental dimension, by introducing chain governance. The element of chain governance envisages how various firms across the entire chain are coordinated (or strategically linked) in order to be more competitive and add more value. Under this framework, the value chains are derived by the nature of demand from the final consumers and the process of globalisation.

The concept of global commodity value chain (GVC) shifts the focus of the analytical framework to demand side factors, compared to the supply side factors that are seen in case of Porter's value chain concept (Gereffi, 1994; Kaplinsky, 2000). This shift in the orientation of the value chain has been a result of the substantial influence that the global retailers wield over the food systems of the developing countries. The control is more forceful in those food commodities that undergo relatively low level of processing and therefore flexible. As the demand consideration varies across markets of different countries, primarily on account of different quality standards emphasised, the producing nation needs to take into account the cost of compliance. For example, the quality criteria prescribed by export markets like US is considerably different from that of Europe. This creates redefinition of markets according to quality criteria, and leads to an association which mutually reinforces quality and demand driven value chains. In such circumstances, the capability of the supplier to adhere to the quality prescriptions ceases to be a major consideration for the hegemonic retailers, and the sunk cost turns irrelevant. The cost of compliance could be prohibitively high for many firms, and the global hegemony of the retailers can be a critical factor that affects the sustenance of the value chain. One prime contribution of the global commodity value chain is the recognition of globalisation as a powerful economic phenomenon in determining food system performance and retailer hegemony as a prime factor that affect the value chain.

Sustainable food value chain

In recent times the value chain analysis has gained wide popularity, mainly to identify and prioritize the intervention points and development strategies for a sector. While the development economics has been focusing more towards the sustainability issues, value chain development literature has not addressed the issue of sustainability as the bottom line of developmental thinking (FAO, 2014). Of particular importance is how the value chain analysis addresses the issues of environment, economics and society at large. Further, the extant value chain framework is criticised for not being subjected to scientific scrutiny as well. The issues of food value chain are quite different from that of other value chain, as they have certain unique characteristics. Firstly, food is a social concern as it affects the health of all consumers, and, therefore, need to be subjected to larger public scrutiny. The factors like residential location of the consumers, habits and preferences related to food, place of origin, country of origin, form of food in terms of the extent of processing etc. have a strong impact on the nature of the VC. Second, the agricultural value chain in general and food value chain in particular affects the food and livelihood security concerns of large section of the population. This predisposes the value chain to larger political considerations. Third, the food value chain depends on the natural environment and, therefore, the costs needs to internalise the externalities out of the environmental factors (that are outside its reach). Four, the quality of food product is difficult to control, in terms of various parameters, and therefore, calls for institutional, organisational and technological interventions throughout the value chain.

The sustainable food value chain (SFVC) concept, as used by FAO, visualises an element of sustainability and applies it to specific nature of food production, value addition and distribution. However, many services used in a single commodity approach are common to many agricultural products- for example, marketing, financing, information etc are used by many commodities, and therefore a more holistic approach would gain currency in the times to come. However, for analytical purpose, the concept of SFVC has to look into commodity chains, so as to delineate the broader trends, identify intervention points and estimate the impacts. The concept of SFVC is relatively newer one, and is largely developed by FAO. Consequently, this session largely relies on the concepts as provided by FAO (2014).

SFVC can be defined as the full range of farms and firms and their successive coordinated value-adding activities that produce particular raw agricultural materials and transform them into particular food products that are sold to final consumers and disposed-off after use, in a manner that is profitable throughout, has broad-based benefits for society and does not permanently deplete natural resources (FAO, 2014). The concept is comprehensive in term of number of actors and the activities undertaken, and takes into consideration the external environment and vertical coordination in some activities. Full range of actors include the direct actors who own each component of the business as well as those who participate in service provision, like credit, R&D, market intelligence and other support services. Further, the concept gives emphasis for ecology as well, as it visualises a non-declining natural capital stock. The core economic activity in the entire process is value addition, through various activities like processing, storing, grading, transporting etc. The major component of the value added can be captured under five head, viz. (a) Salaries for employees; (b) Net profit for asset owners; (c) Tax revenues; (d) Consumer surplus (e) Externalities . The externalities can be positive or negative, or a combination of both. The externalities are unintended effects caused by an economic agent, which are not internalised in terms of compensation, such as increased pollution, biodiversity loss etc (which are negative in nature); and increased water availability useful for the locality(which emerges as positive).

The behaviour and performance of farmers and other agri-food enterprises are determined by a complex environment. The central element of the framework is the value chain actors, who form the core value chain. They represent those who produce or procure from the upstream level, add value to the product and then sell it on to the next level (FAO, 2014). The value chain actors could either be private sector enterprises (as in most cases) or public-sector as in case of Food Corporation of India (who collects foodgrains for buffer stocking as well for distribution through PDS outlets). In a value chain several such agencies can co-exist, who bears striking difference in terms of the size, technology, goals etc., catering to a multiple market segments.

The chain distinguishes four core functions (links): production (e.g. farming or fishing), aggregation, processing and distribution (wholesale and retail). Each of these steps involves costs, which vary depending upon the participants in the value chain. In a small holder dominated agrarian economy, aggregating and storing poses challenges, and will not allow economies of scale, and therefore may be costly. Institutional intervention, in terms of farmer's collectives or producer organisation can be a good option at these levels. Many agencies, including aggregators, distributors, processors etc can be a major actor at this point of time.

In the entire core value chain activities, the major element is value chain governance structure. It refers to the nature of linkages between various actors- both vertical and horizontal. The value

chain governance involves various core activities/ functions such as payment mechanisms, price determination, information exchange, market power, wholesaling etc. The value chain governance in that sense is a function of technology development, the extent of market imperfection, and rules and regulatory framework.

The support providers helps the value chain actors by providing essential roles that helps value creation by value chain actors. The SFVC visualises three kinds of support services

- a. Physical input suppliers (such as seeds, irrigation, chemicals, ice, packaging materials etc.) at different levels of activity
- b. Supply non-financial services (include transport, quality checking, market research, trainings, etc)
- c. Financial services (Provision of capital in terms of credit, which requires growth of the banking systems).

The support system can arise from the public sector, private sector, NGOs, civil society organisations, farmer organisations etc. In some cases, all the services could be provided by a single agency, as a package. For example, many input dealers provide all the services together to the farmers, which may even to extent a buyback arrangement, not necessarily of a contract farming nature. In some cases the aggregator of the producer would be providing these services as a package along with the extension inputs.

Societal and natural environment

The external environment- like society and natural conditions- exerts significant influence on the functioning of the value chain. The societal elements can be broadly classified into four types, viz informal socio-cultural elements (like religious requirements), formal institutional elements (like regulations, laws and policies), organisational elements (like educational facilities) and infrastructural elements (like roads, ports, communication networks etc) (FAO). The value chain operates in an enabling environment shaped by the domestic and international policies. The value chain which caters to the export market is influenced by the international environment more strongly compared to the one which caters more to the domestic consumers. The food safety regulations including CODEX Alimentarius, HACCP etc prescribed by the importing countries are costly and cost of compliance is higher. The certification procedures are tedious and needs international collaboration and verifications.

Interaction of economic, social and environmental elements

The sustainability of the value chain is determined by the economic, social and environmental elements. A value chain is considered economically sustainable if the required activities at the level are economically viable and or profitable. However, the outcome of the economic activity needs to be socially and culturally acceptable to characterise it to be socially sustainable. The environmental sustainability is attained largely if the value chain activities doesn't impact the environment adversely and maintains a non-declining natural capital stock.

Principles of sustainable food value chains

Though each food value chain is unique, the sustainable food value chain is characterised by 10 interrelated principles, as noted below:

- a. Economically sustainable: Commercial viability, competitiveness, growth etc. The upgraded VC should provide higher profits, income etc.
- b. Socially sustainable: Inclusiveness, equitability, social norms, social institutions and organizations. Generation of greater share of value (profit and wage income) to the poor, broad-based, and equitable distribution along the VC, with no adverse effect on the poor.
- c. Environmentally sustainable: Non-declining natural capital stock, for inter-and intra-generational equity. Minimise environmental footprint (water footprint, carbon footprint etc) is an issue.
- d. Dynamic and system based: VC is dynamic due to changes in market demand, technology, available services, profitability, risk, barriers to entry, large-firm behaviour, input supply and policy etc. VC needs to be adapt to changes. Sub-systems are linked, and identifying root cause in the system is the solution to improve.
- e. Governance centred: Needs to analyse how value chain actors of different typology transact vertically and how they collaborate horizontally. The governance needs to bring in win-win solutions, and impart element of trust among the value chain actors.
- f. End-market driven: The value is ultimately determined in the end-market when consumers purchase the product/service; and therefore consumer analysis needs to be the starting point for the VC improvement.
- g. Vision/strategy driven: to be successful, the actors have to carefully target development goals and stakeholders. The strategies need to revolve around a vision which is realistic, quantifiable (as far as possible) and targeting (as far as possible) selected stakeholders. The improvement of VC should focus on that area where where largest impact is possible.
- h. Upgrading focused: It requires carefully assessed and innovative upgrading activities to translate a vision and strategy into an effective plan. The upgradation can be in the form of technology, organisation, institution, network etc.
- i. Scalable: The VC upgrade allow replication process that is based on realistic assumptions.
- j. Multilateral: It requires that the driver of the process of VC upgradation is private sector as driver and the other agencies (public sector and civil society organisations) as facilitators

The fisheries sector has grown in real term at a growth rate of 6.2% per year between 2004-05 and 2015-16. The differential growth rate in inland and marine sectors has led to increased share of inland fisheries, with an element of convergence of the growth. Both public and private sector has contributed to this growth story in terms of quality inputs, technology and extension services.

Further growth has to be brought through enhanced expenditure on fisheries research, education, and extension in all aspects of the value chain along with infusion of capital. Suresh et al (2018) has highlighted the need to prioritize the sectors to infuse capital, while achieving high level of efficiency. Focusing on harvest and post-harvest operations are critical in achieving higher value and income to the stakeholders. Overall, further growth in fisheries has to be achieved through careful prioritization with regard to sub-sectors, investment on research and development of infrastructure including markets.

Fishery sector in India: Trends and compositional change

The fishery sector has almost doubled the total value of output to reach Rs 635 billion in 2014-15, at an annual growth rate of 7.3%. This is constituted by annual growth rate of 9.5% in inland fisheries and 4.7% in marine fisheries. This differential growth has led to a change in composition of inland and marine fisheries in total value of output of fisheries, in favour of inland fisheries. In 2004-05, inland fishery accounted for 49% of value of output of fishery sector, which has changed to and 58% by 2014-15. The state-wise analysis indicates that as on 2014-15, Andhra Pradesh (undivided) accounts for close to 22% of value of output of total fisheries sector, closely followed by Bengal (21%). The major states involved are Tamil Nadu (6.1%), Gujarat (5.3%), Kerala (4.8%), Bihar (4.5%), Assam (4.4%), and Maharashtra (4.3%). A notable feature is the spread of fisheries sector to hitherto underdeveloped areas, coupled with a reduction in the share of the major producers. Among the major producers, the share of Andhra Pradesh, West-Bengal, Kerala and Tamil Nadu has reduced over the time. The analysis indicated that the fisheries sector growth is mainly propelled by inland fisheries. High growth of inland fisheries noted in Jharkhand, Haryana, Assam, Kerala and Rajasthan. It could be that there is scope for utilisation of inland water bodies and rivers for further augmentation of fisheries sector. In marine fishery sector, among major producers, the share West Bengal and Kerala has reduced sharply; whereas Gujarat, Tamil Nadu and Andhra Pradesh shows a slight decline. The paper calls for in-depth study to identify the drivers of fisheries sectors, both in the inland and marine sectors, so as to achieve a sustainable growth.

Sustainable Marine Fishery Value Chain in India

The concept of sustainable value chain is much applicable in fisheries sector. The sector provides livelihood to about 15 million people in India either directly or indirectly. The marine capture fishery sector in India has shown a deceleration in the growth performance, mainly on account of decline in stock reported to be due to several factors including climate change and over fishing. The participants in the value chain include traditional, motorised and mechanised sectors. The fish produced caters to the domestic market mostly in fresh form and export markets in processed form. Fish export is a major foreign exchange earner in India, and therefore are affected by national and international policy and political changes. The transmission of price signals affects the fish capture and processing. The high income incentives of capture fisheries and its processing have attracted investments in the sector. This has led to over-capitalisation, and consequentially over-extraction and stock depletion.

In order to address the sustainability issues of marine capture fisheries, large scale mechanised trawl fishing is banned for certain period during the breeding season of some fishes. This would have negative impact on certain stakeholders, including the labourers who are engaged in certain associated activities, but would have beneficial effect on catch and income in a sustainability perspective.

The domestic and international regulations on fishing, processing and quality control have significant influence on fish value chain, starting from production to waste disposal. Since fish is liable to quick perishability, it is subjected to strict quality controls adhering to stringent norms. The cost of compliance with the extant and emerging quality control norms is capital intensive, and therefore warrants institutional support and handholding in human resource development in the form of acquiring necessary skills. In the whole value chain, one of the major concerns is the extent of benefits accruing to the fisherman, the labourers involved, and, their linkages with the support system.

Entrepreneurship opportunities in marine fishery sector in the sustainable value chain framework

In the context of the evolving concept of sustainable food value chain, the marine fishery sector offers wide opportunity for entrepreneurship development. They include the realms spanning across Harvest and post-harvest technologies, vessel manufacturing/ servicing units, net fabrication and maintenance units, new and improved fish culture methods, Ornamental fishery, seed production technologies, development of detection/ diagnostic kits, waste utilization technology, byproducts development, quality management and test laboratories, processed food products including ready to eat and ready-to-cook product, development of machines for descaling fishes, fish feed manufacturing units, consultancy services, quality management, food packing material manufacturing, input supply, and other support services. The business incubation centres of ICAR-CIFT handholds the establishment of these units and provide technical services. Various government schemes including start-ups, make in India programme etc. provides financial services. NABARD provides financial help through various programmes SHG-Bank linkage, micro-finance and through Farmer Producer Organisations/Companies. A dynamic business leadership can effectively utilize the favorable ecosystem for formation of successful fishery based enterprises.

Further Suggested Readings

FAO (2014) Developing Sustainable Food Value Chains- Guiding Principles, Rome

Humphrey, John and Memedovic, V (2006) Global value chain in agri-food sector, UNIDO, Vienna

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